REMARKS

Claims 19-33 were previously cancelled. Accordingly, Claims 1-18 are pending.

An executed 1.132 Declaration by Dr. Peter M. Bruinenberg accompanies this Amendment.

Substance of the Interview

Applicants wish to thank Examiner Becker for granting an interview, which took place at the U.S. Patent and Trademark Office on October 18, 2007. Representing the applicants at the interview were Mr. Koen Bijvank, Mr. Vincent Melenhorst, Mr. Kees van Woerkom and the undersigned. The examiner's courtesy during the interview was much appreciated. A summary of the interview, and the reasons for patentability of the present claims provided at the interview, follow.

Applicants began the interview with Mr. Bijvank giving a technical review of the science relating to starch and starch products, and a summary of the present invention. Such discussions are reproduced here for the examiner's convenience.

Technical Review of Starch and Starch Products

As any plant, or part of a plant, potatoes are composed of cells. These cells have cell walls and all the necessary organelles to allow the cell to function. The metabolism of a potato cell is such that it produces large amounts of starch. Although water constitutes the largest component of a potato (about 77-84%), as is the case for any plant product, starch is the

component that defines the potato's nutritional value. Starch is present in amounts of about 11-17%. In addition to water and starch, the potato also contains about 1-2% soluble proteins, about 1% of cell walls, and about 3% of other soluble materials, such as salts, sugars and amino acids.

Starch is typically a mixture of two different polysaccharides, i.e., amylose and amylopectin. Both these polysaccharides are made up of glucose monomers; however, these monomers are connected through different bonds. Amylose is a linear polymer. Amylopectin has a highly branched structure. Depending on the botanical source of the starch (e.g., potato starch, corn starch and rice starch), the degree of polymerization of the amylose and the amylopectin, and the degree of branching of the amylopectin will differ.

Starch is produced by plants in the form of starch granules. Depending on the particular botanical source of a starch, granules have a certain amylose and amylopectin content. For example, starch granules from a native (i.e., natural) potato consist of approximately 20% amylose and 80% amylopectin.

Due to its granular structure, starch is not soluble in water at room temperature. However, when dispersed in sufficient quantities of water and heated to a particular temperature, the granular structure disappears irreversibly. This phenomenon is referred to as gelatinization. Different starches have different gelatinization temperatures.

Present Invention

The snack food of the present invention is prepared from potatoes that have been modified genetically either by recombinant technology or by mutation. The cells in these potatoes produce starch that is at least 95% of amylopectin. The balance of the starch is, of

course, amylose. Thus, the starch granules of the potatoes used in accordance with the invention to produce the snack food comprise about 95% or more amylopectin.

In order to prepare the snack food of the present invention, potatoes are used to make potato flakes and/or potato granules. These are small pieces of dehydrated, cooked potato which have either a flake or a granular form. Thus, the potato flakes and potato granules are pieces from a *whole* potato and differ in composition from a raw potato only in their water content. The potato cells are predominantly still intact in these flakes and granules; and the starch is essentially still contained in these cells. (Note "potato granules" must not be confused with the "starch granules" discussed above.)

Preferably, the potato flakes and/or potato granules are used to prepare dough. In addition to the potato flakes and/or potato granules, the dough typically contains some water, some isolated starch and other ingredients, such as salt and flavorings. The amount of water in the dough is insufficient to allow the isolated native starch to gelatinize upon heating.

The dough is heated (i.e., cooked) by, for instance, baking or frying upon which it expands to form the desired snack food. Surprisingly, as a result of using potatoes in which the starch comprises 95% or more amylopectin, rather than natural potatoes in which the starch comprises only about 80% amylopectin, the snack food of the present invention is much more expanded after heating than snack foods of the prior art. The greater expansion provides a very airy and brittle structure with a very pleasant texture.

Rejections under 35 U.S.C. §112

Claims 1-17 are rejected as failing to comply with the written description requirement, and as being indefinite. In particular, the examiner alleges that:

> Claim 1 recites "amylopectin starch having an amylopectin content of at least 95 wt%, and wherein the amylose content of the amylopectin starch is less than 5wt%." (Office Action paragraph bridging pages 2 and 3, and page 3, paragraph 6.)

During the interview, the examiner elaborated on his rejections. He indicated that the claims seem to define "amylopectin starch" as containing both amylopectin and amylose. He did not understand how amylopectin starch can also contain amylose starch.

Applicants explained that the snack foods were prepared from pieces (i.e., flakes and granules) of whole potatoes which have high amylopectin content. The examiner suggested that the claims be amended "to better point out the high amylopectin potato is the raw material for the flakes/granules" (Interview Summary).

Accordingly, Claims 1, 4 and 15 have been amended to recite that the flakes and/or granules are "prepared from potato of which the starch has an amylopectin content of at least 95 wt%."

Support for these amendments can be found throughout the specification. For example, on page 4, beginning on line 12, it is stated:

> The expressions "high amylopectin potato flakes" and "high amylopectin potato granules" as used herein are to be understood as meaning potato flakes or granules, respectively, prepared from potatoes of which the starch has an amylopectin content of....preferably 95% or more...

Accordingly, withdrawal of these rejections is respectfully requested.

Also note, Claim 3 has been amended to recite that the flakes and/or granules are prepared from normal potato; and Claim 18 has been made dependent on Claim 1.

Rejection under 35 U.S.C. §103 over *Villagran* in View of *Tallberg* and *Buwalda*

Claims 1-9 and 15-18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Martines-Serna Villagran *et al.* (U.S. Patent No. 6,544,580, hereinafter "*Villagran*") in view of Tallberg *et al.* (U.S. Patent No. 5,824,798, hereinafter "*Tallberg*") and *Buwalda* ("Sheer Versatility" *Potato Business World* May/June 1998). (See Office Action pages 3-4, paragraph 8.)

The examiner states that it would be obvious to incorporate the high amylopectin potato of *Tallberg* and *Buwalda* into the invention of *Villagran* because: *i*) *Villagran* teaches the use of "any commercially-available potato used to prepare flakes can be used to prepare the dehydrated flakes of the present invention" (col. 4, lines 23-26, of *Villagran*); *ii*) *Villagran* uses starch with a decreased amylose content (col. 7, line 31); *iii*) the high amylopectin potato starch of *Tallberg* has not been subjected to chemical modification; *iv*) the *Tallberg* potato eliminates the need for blanching and preconditioning required in *Villagran*; and *v*) the amylopectin starch of *Buwalda* provides improved expansion properties in snack foods.

The snack products of the present invention comprise potato flakes and/or granules. Flakes and/or granules are pieces of whole potatoes. These flakes and/or granules have a high amylopectin content, *i.e.*, an amylopectin content of at least 95% on a dry weight basis. (See page 4, lines 9-19, of the specification.) One of the features of the present invention is that the use of potato flakes and/or granules with high amylopectin content provides an unexpectedly **increased expansion** in snack foods. The examples of the present application clearly

demonstrate such increased expansion. In particular, see the tables on pages 16 and 19. These tables show that replacing potato flakes/granules of normal amylopectin content with potato flakes/granules of high amylopectin content provides an increase in expansion. See page 5, lines 4-9, of the specification.

PRIMARY REFERENCE: *Villagran*

During the interview, the applicants indicated that *Villagran* does not teach high amylopectin potato for use in its methods, and, in fact, explicitly teaches away from the use of high amylopectin potato pieces in its methods.

Villagran Explicitly Teaches away from Using Potato Flakes with a High Amylopectin Content in its Methods

The examiner points to col. 7, line 31, of *Villagran* for the teaching of starch with a decreased amylose content. In that section, *Villagran* describes flakes produced by blanching and preconditioning. Applicants disagree with the examiner's analysis, as described below.

Villagran states that high amylopectin potato is undesirable

Villagran teaches a method of making dehydrated potato flakes prepared from potato pieces. *Villagran* states that "the cooking process is critical to obtaining the desired potato flake" (col. 4, line 50-51). (Emphasis added.) *Villagran* prescribes a precise slow cooking process to achieve the desirable potato flake. In the process, there is a slow continuous rise in temperature during the first third of the cooking cycle (col. 4, lines 55-67). *Villagran* states that

such cooking will allow the potato granule to sufficiently cook, swell and gelatinize (sentence bridging col. 4 and 5).

Villagran also describes two types of cooking processes which would produce an undesirable flake. First, rapid cooking provides an undesirable flake. The undesirable potato flake is described as having "low amylose content" (col. 5, lines 2-11). Second, overcooking produces an undesirable flake. The undesirable potato flake is described as having "high levels of gelatinized (amylopectin) starch... " (col. 5, lines 18-20).

Villagran explicitly states why high levels of amylopectin are undesirable. *Villagran* states that amylopectin starch "will produce a sticky dough" (col. 5, lines 18-20). Instead of using such sticky dough, *Villagran* emphasizes that the flakes resulting from their invention "can be used to prepare a more cohesive, non-adhesive, machineable dough."

Thus, Villagran clearly teaches away from using high amylopectin potato flakes in their methods. In direct contrast, the pending claims require high amylopectin potato flakes.

Villagran explicitly describes the amylose content of its flakes

At col. 7, line 39 et seq., *Villagran* states that its flakes have unique physical properties. The first of these properties is the amylose content of its flakes. At col. 8, lines 34-37, the dehydrated potato flake made from raw potato pieces comprise "from about 20% to about 27% amylose, preferably from about 22% to about 25%, more preferably about 21% to about 24% amylose." Thus, the **most preferred range** has **more amylose** than the broad range. Thus, contrary to the examiner's contention, *Villagran* does not teach that less amylose is preferred.

Similarly, at col. 8, lines 38-41, the dehydrated potato flake made from pre-conditioned

potato pieces comprise "from about 16% to about 20% amylose, preferably from about 17% to about 19% amylose, and more preferably about 18% amylose." Thus, the **most preferred amylose content** is **higher** than the broad range. Thus, again, contrary to the examiner's contention, *Villagran* does not teach that less amylose is preferred.

It is key that the examiner supports his point that "the preferred potato flakes" of *Villagran* have a decreased amylose content by pointing to col. 7, line 31, of *Villagran*. There, *Villagran* states that pre-conditioned potato flakes comprise "about 16% to about 20% amylose." As stated above, *Villagran* states that despite having flakes with about 16% amylose, 18% amylose is most preferred. Thus, *Villagran* clearly does not teach that flakes with the lowest amount of amylose are preferred.

In direct contrast, pending Claim 1 recites potato pieces (i.e., flakes and granules) with amylopectin content of at least 95wt%. Thus, it follows that the most amylose that the flake of Claim 1 can have is 5wt%.

High Amylopectin Potato has NEVER been Commercially Available

The examiner states that *Villagran* teaches the use of "any commercially-available potato used to prepare flakes can be used to prepare the dehydrated flakes of the present invention" (col. 4, lines 23-26 of *Villagran*). Thus, the examiner alleges that *Villagran* teaches that any flake, including high amylopectin potato flake, would be suitable in the methods of *Villagran*.

Applicants disagree with the examiner's analysis. The fact that *Villagran* teaches the use of "any commercially-available potato" is consistent with and supports *Villagran's* teaching away from using high amylopectin potato in its invention.

High amylopectin potato has never been commercially available. (See paragraphs 5 and 6 of the accompanying declaration by Dr. Bruinenberg.) Thus, high amylopectin potato pieces used in the present invention do not fit the definition of the types of potatoes *Villagran* states are suitable for its methods.

It is significant that, although not commercially available, high amylopectin potato was known when the *Villagran* application was written. The fact that high amylopectin potato was known is demonstrated by *Tallberg* (published as WO92/11376 on July 9, 1992). Thus, apparently *Villagran* purposefully chose to exclude high amylopectin potato flakes from its methods.

Also note, instead of specifically reciting "any commercially-available potato," *Villagran* could have more easily stated "any potato." However, *Villagran* instead took the trouble to specify that "commercially-available" potato was to be used.

The fact that *Villagran* only recites "commercially-available potato" is consistent with the fact that *Villagran* emphasizes throughout the patent that high amylopectin content is undesirable.

During the interview, the examiner said that *Villagran* does not recite "commercially-available" potatoes to the exclusion of other types of potatoes. However, a skilled artisan reading *Villagran* would have been led to believe that high amylopectin potato would not have been suitable for use in the methods of *Villagran* for the many aforementioned reasons. The whole picture drawn by *Villagran* instructs a skilled artisan to not use high amylopectin potato

flakes.

Summary of the Teaching of *Villagran*

- *Villagran* teaches away from using high amylopectin potato flakes in its methods because it specifically recites the undesirable characteristics of high amylopectin levels.
- *Villagran* teaches away from using high amylopectin potato flakes in its methods because it specifically states that flakes with 16% amylose were available, yet states that flakes with 18% amylose were preferred.
- *Villagran* states that its methods can be used with "any commercially-available potato." Although high amylopectin potato was known at the time *Villagran* was written, it has never been commercially-available. Thus, *Villagran* specifically excludes high amylopectin potato from its methods.

Accordingly, *Villagran* fails to teach the element of the claimed invention that the examiner asserts is taught by the reference. Thus, *Villagran* **fails** as a primary reference.

SECONDARY REFERENCES: *Tallberg* and *Buwalda*

Applicants have demonstrated above that *Villagran* does not contemplate the use of high amylopectin potato pieces and in fact teaches away from it. Accordingly, the primary reference (i.e., *Villagran*) **fails** to teach the element of the claimed invention that the examiner asserts is taught by the reference. In such a case, secondary references (i.e., *Tallberg* and *Buwalda*), in combination with the primary reference, or by themselves, cannot support the obviousness rejection. Thus, withdrawal of the obviousness rejection is respectfully requested.

Nevertheless, a review of each secondary reference (i.e., *Tallberg* and *Buwalda*) is provided to emphasize that it cannot, in combination with the primary reference and each other, or by itself, support the obviousness rejection.

Tallberg

Tallberg teaches genetic modification of potato plants to obtain amylopectin potato. The examiner alleges that a skilled artisan would combine *Villagran* and *Tallberg* because *Villagran* uses starch with a decreased amylose content; and the high amylopectin potato starch of *Tallberg* has not been subjected to chemical modification, making it more suitable as a food ingredient, and eliminates the need for blanching and preconditioning required in *Villagran*.

As discussed above, *Villagran* teaches that an amylopectin content as high as in the potato taught by *Tallberg* is **not** suitable in *Villagran's* methods. The most preferred level of amylose taught by *Villagran* is 18% amylose. Such a level of amylose is higher than the level of amylose achieved by *Villagran* (i.e., 16% amylose). Thus, *Villagran* teaches that a relatively high level of amylose is required. Accordingly, the examiner's contention that *Tallberg* eliminates the need for chemical modification/blanching/preconditioning is not relevant. The *Tallberg* potato is simply deemed not suitable by *Villagran*.

Also, it is significant that *Tallberg* was published (i.e., July 9, 1992) before the *Villagran* application was written (i.e., July 1, 1996). *Villagran* purposefully did not include high amylopectin potato flakes in their methods. This is consistent with the fact that *Villagran*

teaches away from using high amylopectin potato pieces in their methods, as discussed in detail above.

Buwalda

The examiner alleges that *Buwalda* states that amylopectin potato starch provides improved expansion properties in snack foods.

The examiner has ignored that *Buwalda* teaches **isolated** potato starch; whereas *Villagran* teaches potato **flakes**, i.e., pieces. *Buwalda* does not teach anything about high amylopectin potato pieces.

The author of *Buwalda*, *i.e.*, Dr. Buwalda, corroborated that his article only addresses **isolated** starch in his declaration (filed on April 18, 2007). However, even without Dr. Buwalda's declaration, it is clear from the article itself that only isolated starch is addressed. In the article, starch is discussed as a chemical, which may be suspended or dissolved, and derivatized. A skilled artisan of starch chemistry would not refer to starch in such a manner if he were discussing starch which is still contained in potato pieces (e.g., flakes and granules). Also see page 11, the middle column, first paragraph where it is stated: "As potato starch is a mixture of amylopectin and amylose, solutions have a tendency to retrograde." This statement cannot relate to potato pieces which also contain 20 wt.% of non-starch components such as proteins, fibers, non-reducing sugars and amino acids. Also, see page 12, 1st column, 3rd paragraph, which discusses the "solubility" of starch in hot and cold water.

The fact that *Buwalda* only teaches isolated starch is critical. There are essential

differences in the physical characteristics (e.g., rheological characteristics) between isolated potato starch and potato pieces, as would be known by a skilled artisan. For example, in potato pieces, starch is embedded in a matrix of other constituents; whereas, isolated starch is not embedded in a matrix. The other constituents include soluble proteins, cell walls and other soluble materials (e.g., salts, sugars, and amino acids). Being embedded in a matrix, the starch in the potato pieces is tied up and cannot behave in the same way isolated starch would behave.

A skilled artisan would have known about the fundamental differences between isolated starch and starch in potato pieces. Thus, knowing that isolated amylopectin starch provides improved expansion properties in snack foods would not have taught a skilled artisan anything about the effect amylopectin potato pieces may have on the expansion of snack foods. That is, the effect that isolated amylopectin starch has on expansion is virtually irrelevant to the effect amylopectin pieces may have on expansion.

Combination of *Villagran, Tallberg* and *Buwalda*

Tallberg and *Buwalda* do not remedy the teaching away by *Villagran*. *Villagran* discourages the use of high amylopectin flakes. Thus, a skilled artisan would be dissuaded from using pieces (i.e., flakes) from the *Tallberg* potato in the *Villagran* methods. *Buwalda* simply teaches that isolated starch may increase expansion. Due to the fundamental differences in the physical characteristics of isolated potato starch *vis-à-vis* potato pieces, the effect isolated amylopectin starch has on expansion behavior teaches nothing about the effect pieces of amylopectin potato has on expansion behavior.

Thus, combining *Villagran*, *Tallberg* and *Buwalda*, at most, the skilled artisan would use the isolated starch of *Buwalda* as an "other starch-containing ingredient" described by *Villagran* (col. 10, lines 45-55) and combine it with the potato flake of normal amylopectin content as described by *Villagran* to form a dough composition.

Summary of the Teaching of *Villagran, Tallberg and Buwalda*

- *Villagran* teaches away from using high amylopectin potato flakes in its methods.
- *Tallberg* discloses the availability of amylopectin potato but *Villagran* did not include it in its methods.
- *Buwalda's* disclosure regarding the effect of isolated amylopectin starch on expansion teaches nothing about the effect of amylopectin potato pieces on expansion.

Thus, there is no motivation or teaching to combine the references. In fact, there is a teaching away of combining the references. Accordingly, applicants request withdrawal of this obviousness rejection.

Other Rejections under 35 U.S.C. §103 with *Villagran* as Primary Reference

Claims 10-14 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Villagran* in view of *Tallberg* and *Buwalda*, and further in view of Jeffcoat et al. (U.S. Patent No. 6,541,060, hereinafter "*Jeffcoat*"). (Office Action page 5, paragraph 9.)

Since the claims upon which Claims 10-14 depend are not obvious over *Villagran* in view of *Tallberg* and *Buwalda*, as discussed above, the further disclosure by *Jeffcoat* does not render Claims 10-14 obvious. Accordingly, applicants request withdrawal of this obviousness

rejection.

Claims 1-9 and 15-18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Villagran* in view of *Buwalda* and *Ståhl* (U.S. Patent No. 5,759,597). (Office Action page 5, paragraph 10.)

As discussed above, in view of the teaching away by *Villagran*, a skilled artisan would not have been motivated to use amylopectin potato pieces in its methods; and *Buwalda* simply discusses isolated starch. *Ståhl* relates to isolated amylopectin potato starch as a filling agent and thus adds nothing to remedy the deficiencies in *Villagran* and *Buwalda*. Accordingly, applicants request withdrawal of this obviousness rejection.

Claims 10-14 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Villagran* in view of *Ståhl* and *Buwalda*, and further in view of *Jeffcoat*. (Office Action page 7, paragraph 11.)

Since the claims upon which Claims 10-14 depend are not obvious over *Villagran* in view of *Buwalda* and *Ståhl*, as discussed above, the further disclosure by *Jeffcoat* does not render Claims 10-14 obvious. Accordingly, applicants request withdrawal of this obviousness rejection.

Claims 1-9 and 15-18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Villagran* in view of *Buwalda*. (Office Action page 8, paragraph 12.)

As discussed above, in view of the teaching away by *Villagran*, a skilled artisan would not have been motivated to use amylopectin potato pieces in his methods. *Buwalda* simply

discusses isolated starch which teaches nothing about potato pieces, as discussed above. Accordingly, applicants request withdrawal of this obviousness rejection.

Claims 10-14 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Villagran* in view of *Buwalda*, and further in view of *Jeffcoat*. (Office Action page 9, paragraph 13.)

Since the claims upon which Claims 10-14 depend are not obvious over *Villagran* in view of *Buwalda*, as discussed above, the further disclosure by *Jeffcoat* does not render Claims 10-14 obvious. Accordingly, applicants request withdrawal of this obviousness rejection.

Applicants respectfully submit that the application is now in condition for allowance, which action is earnestly solicited. If resolution of any remaining issue is required prior to allowance of this application, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectively submitted,

/s/susan a. sipos
Susan A. Sipos
Registration No. 43,128
Attorney for Applicants

HOFFMANN & BARON, LLP
6900 Jericho Turnpike
Syosset, New York, 11791
(516) 822-3550
SAS
282591